TriangleTube

prestige

Condensing Water Boiler

SERVICE TECHNICIAN'S

TROUBLE SHOOTING GUIDE

Date revised: 5/11/09

2008-36 TSG-PRESTIGE

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Definitions

WARNING

Indicates a potentially hazardous situation which, if ignored, can result in death, serious injury or substantial property damage.

CAUTION

Indicates a potentially hazardous situation which, if ignored, can result in minor injury, property damage.

NOTICE

Indicates special instructions on installation, operation or maintenance, which are important to the equipment/product, but not related to personal injury hazards.

WARNING

This guide is to be used in conjunction with the PRESTIGE Boiler Installation and Maintenance Manual. Procedures and servicing listed in this manual must be performed by a qualified service technician, installer, service agency or gas supplier. Any procedures or service performed by an unqualified individual or service agency can result in severe personal injury, death or substantial property damage.

Introduction

This guide is to be used in conjunction with the Triangle Tube PRESTIGE Boiler Installation and Maintenance Manual.

Good Troubleshooting Practices

Before leaving for the job site:

Check your parts and tools

- Test equipment and tools you will need:
  Electrical meter that tests both voltage (AC/DC), continuity (ØΩ), resistance (Ω,ohms), and frequency (Hz)
  Temperature gauge or metering device
  Manometer
  Calibrated Combustion Analyzer
  Standard tools of the trade (wrenches, screwdrivers...)
- Parts to solve most problems
  Control module
  Transformer with surge protection
  Blower with gasket
  PS 399 Parts Case - PSRKIT102
  PS 60-250 Parts Case - PSRKIT103

Review all appropriate manuals before leaving for the job site

At the job site:

- Clarify problem
- Have the PRESTIGE manual and any other wiring, zone control or piping diagrams, or installation guides readily available.

REMEMBER

Follow the Troubleshooting Guide step by step, always double checking your results. Skipping steps or not completing steps can lead to wrong conclusions, repeated visits to the job site, unhappy customers and unnecessary warranty claims.

WARNING

Label all wires and wire connections prior to disconnecting when servicing any boiler controls. Wiring errors can cause improper and dangerous operation. Always disconnect the power supply to the boiler before servicing. Failure to comply could result in severe personal injury, death or substantial property damage.

WARNING

Never bypass (jumper) any boiler, control or device except for momentary testing when troubleshooting the boiler as outlined in this guide, severe personal injury, death or substantial property damage can result.

Initial Troubleshooting Checks

- Ensure all wire connectors to the control module and sensors are securely connected.
- Ensure the maximum gas supply pressure does not exceed 13”w.c. during flow or no flow conditions.
- Ensure the gas supply pressure is a minimum 5” w.c. during flow conditions (burner firing on all gas appliances).

Control Module Fuses

NOTICE

The control module contains 2 internal replaceable fuses. Ensure the fuses are in working condition prior to replacing the control module or any boiler component. If one of the fuses has blown, it will prevent the control module and/or boiler components from operating properly.

To check or replace the control module fuses:

1. Disconnect the external power supply to the boiler.
2. Remove the front jacket panel of the boiler by removing the thumb screw along the top edge.
3. Remove the electrical connectors at the MCBA control module for the igniter, transformer and display (ribbon cable) and the black plastic housing cover off the control module. Use care not to damage the cover when removing it.
4. Remove both fuses and check for continuity to determine if fuse is blown, replace if necessary.
5. The control module is supplied from the factory with 2 spare fuses, a 5 amp fast acting fuse and a 4 amp slow acting fuse, attached to the control module cover.
6. When replacing the fuses ensure the amp rating and type of the fuse matches the replacement fuse. Reference Fig. 1, page 4 for amperage and location of the fuses.

WARNING

Do not bypass any fuse with a jumper. Do not replace any fuse with a fuse that is not specified. Failure to comply could result in severe personal injury, death or substantial property damage.

7. Re-install the control module cover, electrical connectors and the front jacket panel when completed.

8. Reconnect the external power supply to the boiler and perform the verification of operation steps as outline in the Prestige Installation Manual.

WARNING

After completing any servicing of the boiler verify proper operation of the boiler. Steps to verify proper operation are outlined in the Start-Up Procedures in the PRESTIGE Boiler Installation and Maintenance Manual. Failure to comply could result in severe personal injury, death or substantial property damage.

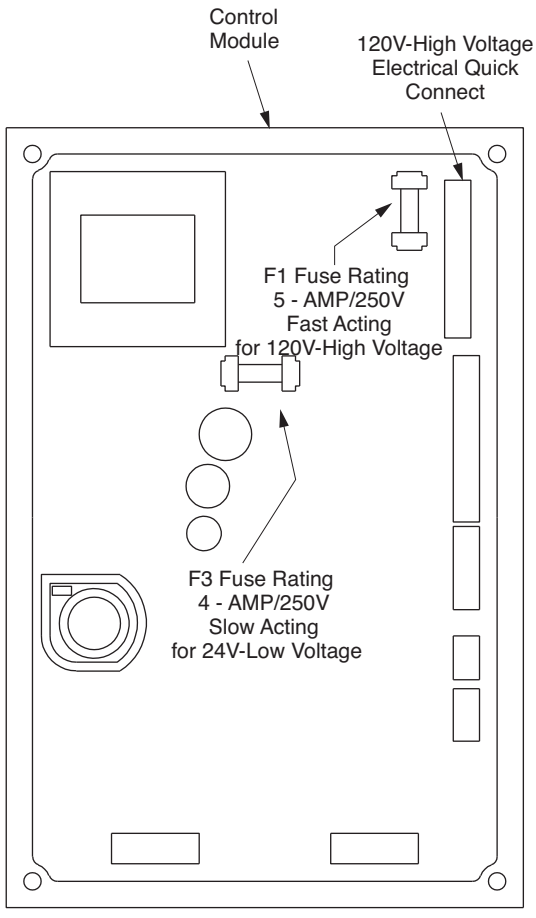


Fig. 1 Control Module Fuse Locations (Housing Cover Removed)

Standby Mode

After the boiler is turned on, the control panel will be in the STANDBY mode.

This is the standard mode for the PRESTIGE. The control automatically returns to this mode after 20 minutes if no keys have been pressed on the display. Any parameters that were modified are then stored.

The first character shows (on the left side of the display) the current status of the boiler depending on the condition of both the boiler and the burner. The last 3 characters indicate the boiler supply temperature.

If the burner is blocked due to a “soft” lockout, the display alternates between a 9 followed by the boiler supply temperature and “b” with a two digit error code. See page 12 -16 for detailed information on the corrective and preventive actions for the soft lockouts.

Display	Boiler function
	Internal check
	Test function: Burner on, high fire mode
	Test function: Burner on, low fire mode

TO TEMPORARILY PLACE THE BURNER INTO HIGH FIRE TEST MODE: press the MODE button until “ ” is displayed. Then press and hold both the MODE and “+” buttons simultaneously until the first digit flashes “H”.

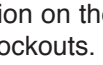
While in the test mode:

- high limit will function
- boiler CH circulator will function
- domestic circulator will not function
- the test mode will time out in approximately 10 minutes

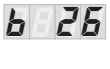
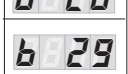
TO TEMPORARILY PLACE THE BURNER INTO LOW FIRE TEST MODE: press the MODE button until “” is displayed. Then press and hold both MODE and “-” buttons simultaneously until the first digit flashes “L”.

TO DEACTIVATE THE HIGH OR LOW FIRE TEST MODE: press the MODE button until “” is displayed. Then press and hold both the “+” and “-” buttons simultaneously to deactivate the high or low fire test mode.

NOTICE

If the “+” button is held in, the CH system (parameter 3) will be turned OFF and the display will show “  ”. Press and hold the “+” button to turn the CH system back ON, the display will show “c” followed by CH set point. If the “-” button is held in while in the “” mode, domestic system (parameter 2) will be turned OFF and the display will show “”. Press and hold “-” button to turn the domestic system back ON, the display will show “d” followed by domestic set point temperature.

Standby Mode Display

Display	Boiler function
	STANDBY, no demand
	Fan prepurge or post purge cycle
	Ignition sequence
	Burner ON for space heating (CH)
	Burner ON for domestic hot water (DHW)
	Pre-check for air flow prior to prepurge cycle
	Burner OFF due to reaching temperature setpoint
	Space Heating (CH) post pump cycle
	Domestic hot water (DHW) post pump cycle
	Burner blocked:
	Supply temperature too high (202°F) . Burner will remain OFF until temperature drops below 200°F
	Return temperature too high (202°F). Burner will remain OFF until temperature drops below 200°F
	Return temperature is higher than supply temperature. Burner will remain OFF until corrected.
	Supply temperature increased too quickly. Burner will remain OFF for a 10 minute period. Burner will recycle, increasing waiting period 1 minute for a max. 15 minutes
	Factory supplied LWCO device or external limit (terminals 15 & 16) is OPEN. Burner off for 150 seconds, auto reset.
	No blower signal
	Blower signal present with no demand, Burner will remain OFF until condition terminates
	Temperature difference between the supply and return is more than 72°F. Burner will remain OFF for 150 seconds. Burner will recycle increasing wating period 1 minute for a max. 20 cycle.
	Indirect water heater temperature sensor is short-circuited. Burner OFF until corrected.
	Flue temperature sensor is short-circuited. Burner OFF until corrected
	Indirect water heater temperature sensor is “open” or disconnected. Burner OFF until corrected.
	Flue temperature senor is “open” Burner OFF until corrected.
	Flue temperature greater than 240°F but less than 250°F. Burner off for 150 seconds
	Wait for the blower to start
	Power frequency deviation
	Flame current signal lost

Parameter Mode PARA

To access PARAMETER mode when the system is in STANDBY mode, press the MODE button once.

Key: Display

Pressing MODE once

To scroll through the list of parameters, simply press the “STEP” button. The First digit is the parameter number followed by the parameter value. To modify a parameter value, use the + or - keys. Then press “STORE” to save the value you just changed. The display flashes once to confirm the data has been saved.

To activate the parameters you changed, press RESET. However, if you do not press a key, the system returns to STANDBY mode after 20 minutes and automatically stores the changes.

Key:	Display	Description of parameters
STEP	1.140	Domestic Hot Water Setting **(See Note 1)**
STEP	2.01	DHW Application Selection **(See Note 2)**
STEP	3.01	CH Application Selection **(See Note 3)**
STEP	4.186	CH Maximum Boiler Operating Setpoint

Note 1: This parameter is factory set to 140ºF. It is important to note the control adds 46ºF to this setting, therefore the actual domestic hot water boiler setpoint is 140ºF + 46ºF = 186ºF.

Note 2: This parameter should not be changed from the factory setting of 01. The performance of the DHW (Domestic Hot Water Heating) will be affected and can become unreliable.

Note 3: This parameter should not be changed from the factory setting of 01. The performance of the CH (Central/Space Heating) will be affected and can become unreliable.

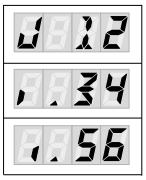
Accessing Boiler Information

Information mode

To switch from STANDBY mode to Information mode, press MODE twice.

Press STEP until the system displays the information you need. The decimal point located behind the first position flashes to indicate that the boiler is in INFO mode.

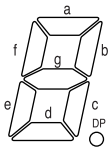
NOTICE



The ignition counters and burner hours are split into three two digit numbers.
For example:
Write the numbers down from left to right to arrive at 123,456 CH ignitions.

NOTICE

Information Mode Items



Display Digit Segments

Item	Value
1	Supply Water Temperature ºF
2	Return Water Temperature ºF
3	DHW Water Temperture ºF (Optional)
4	Outdoor Temperture ºF (Optional)
5	Flue Temperature ºF
6	Boiler Setpoint ºF
7	Rate of Increase of Supply Water Temperature ºF/Sec.
8	Rate of Increase of Return Water Temperature ºF/Sec.
9	Rate of Increase of DHW Water Temperature ºF/Sec.
A	Not Used
B	Not Used
C	Not Used
D	Not Used
E	Ionization Current in micro-ampere
F	Analog Input Voltage
G	Not Used
H	MCBA Internal Temperture ºF
I	CH Ignition Counter (100 thousands / 10 thousands)
Seg. e	CH Ignition Counter (thousands / hundreds)
Seg. c	CH Ignition Counter (ten / ones)
J	CH Ignition Hours (100 thousands / 10 thousands)
Seg. e	CH Ignition Hours (thousands / hundreds)
Seg. c	CH Ignition Hours (ten / ones)
L	DHW Ignition Counter (100 thousands / 10 thousands)
Seg. e	DHW Ignition Counter (thousands / hundreds)
Seg. c	DHW Ignition Counter (ten / ones)
N	DHW Burner Counter (100 thousands / 10 thousands)
Seg. e	DHW Burner Counter (thousands / hundreds)
Seg. c	DHW Burner Counter (ten / ones)

In the INFO Mode a temperature reading of -22 typically indicates an "open" circuit. A temperature reading of 240 typically indicates a short-circuit.

Error Hard Lockout Mode

If a serious fault occurs, the system enters a hard lockout condition which requires a manual reset by pressing the RESET Button. A hard lockout is indicated by displaying an E for the first digit, followed by the error code.

For detailed information on the corrective and preventive actions for the hard lockout, see pages 17-24.

CAUTION

The boiler freeze protection feature is disabled during a Hard Lockout, however the CH circulator will operate.

CAUTION

During a hard lockout or low water condition the boiler will not re-start without service. If the heating system is left unattended in cold weather appropriate safeguards or alarms should be installed to prevent property damage.

NOTICE

An optional AM-4 Interface module kit, PSRKIT23 can be added to any Prestige to provide contacts for an external alarm in the event the boiler enters into a hard Lockout.

Display	Hard Lockout
E 00	Flame detected prior to burner startup
E 02	Failed ignition after 5 attempts
E 03	Gas valve harness not properly connected
E 04	Power supply lost after lockout occured
E 05	Internal control failure
E 06	Internal control failure
E 07	Internal control failure
E 08	Internal control failure
E 09	Internal control failure
E 11	Internal control failure
E 12	External limit (terminals 13 & 14) is OPEN
E 13	Internal control failure
E 14	Low voltage internal short or voltage backfeed
E 15	Internal control failure
E 16	Internal control failure
E 17	Internal control failure
E 18	Supply Temperature exceeds 212°F
E 19	Return Temperature exceeds 212° F
E 24	Low voltage internal short circuit
E 25	Supply Temperature increased too rapidly
E 28	No blower signal present
E 29	Blower signal does not reset to zero
E 31	Supply Temperature sensor is short circuited
E 32	Return Temperature sensor is short circuited
E 35	Flue Temperature sensor is short circuit
E 36	Supply Temperature sensor is OPEN
E 37	Return Temperature sensor is OPEN
E 48	Flue Temperature sensor is OPEN
E 44	Internal control failure
E 52	Flue Temperature exceeds 250° F
E 60	Internal control error - failure to read parameters
E 61	Internal control failure
E 65	Inadequate power supply to the fan
E113	Invalid power frequency
E115	Internal control failure
E122	Supply or Return Temperature sensor drift
E123	Supply or Return Temperature failure
E124	Supply or Return Temperature not changing

Boiler control display is blank

- Check for 120 volts at terminals L and N of the 120V terminal strip
  - If no power is measured check the external power supply, external fuse or breaker.
- Check the internal fuse F1 by locating the control module and removing the black housing. The internal fuse F1 is located in the right corner of the control module near the 120V high voltage electrical connector on the control as shown in Fig. 1, page 4. See Servicing Tips and Instructions, page 3, for accessing the internal fuses of the control module.
  - Disconnect electrical supply power to the boiler and remove the F1 fuse from the MCBA. Check continuity across the fuse. If continuity is not present, the fuse has blown, replace the fuse with a 5 amp/250V fast acting fuse. Check the wiring for possible causes for the fuse to blow.(shorted wiring to circulator)
- Check external wiring at 120V terminal strip and boiler internal wiring, ensure all wiring is properly connected, in good condition and all control module and boiler connections are secure.
  - Correct/replace any mis-wiring or wiring components if needed. If problem continues replace the control module.

Boiler display shows UI.25 or UI.22

- Check transformer connections
- Check the internal fuse F3 by locating the control module and removing the black housing. The internal fuse F3 is located in the center of the control module as shown in Fig. 1 page 4. See servicing tips and instructions, page 3, for accessing the internal fuses of the control module.
  - Disconnect electrical supply power to the boiler and remove the F3 fuse from the MCBA.
  - Check continuity across the fuse. If continuity is not present, the fuse has blown.
  - If fuse F3 has blown, replace the fuse with a 4-amp/250V slow acting fuse. Check external boiler wiring for exteral source of 24V backfeed.

Boiler display shows a 0 for the first digit on the left followed by 2 or 3 digits (boiler temperature)

- Check to see if room and DHW thermostats are satisfied.
  - If the thermostats are satisfied the boiler is off due to no call for heat. Turn up a thermostat and the boiler should begin ignition sequence.
- If the room thermostat or DHW thermostat is calling for heat and the boiler is not firing and the boiler is below the maximum operating temperature.
  - Check and verify Parameters 2 and 3 are correct as outlined on page 6. Both parameters should be set as “01”, which turns DHW and CH modes ON.
  - Temporarily jump low voltage terminals 7 and 8 on the 24V terminal strip. If boiler operates check the room thermostat wiring and thermostat control. Replace as needed. Remove jumper when completed.
  - Temporarily jump low voltage terminals 11 and 12 on the 24V terminal strip. If boiler operates check the DHW thermostat wiring and thermostat control. Replace as needed. Remove jumper when completed.
  - Disconnect power to the boiler. Check all wiring and wiring connections and compare to the wiring diagram. Ensure all wiring and wiring connection are in good condition and secure. If necessary, replace complete wiring harness.
  - Check for 24 volts across the control module internal fuse F3, which is located toward the middle of the control see Fig. 1 page 4. If necessary replace the fuse. See Serving Tips and Instructions, page 3, for accessing the internal fuses of the control module.
  - Check Item 6 in the INFO mode. If Item 6 shows a reading of 32, remove the air inlet tube from venturi on the Blower/Burner Assembly. Looking into the inlet of the venturi, check for any rotation of the blower impeller. If the blower impeller is rotating, replace the blower.

- If all the above steps fail to resolve the problem, replace the control module.

Boiler display shows a number of 1 to 8 for the first digit on the left followed by 2 or 3 digits (boiler temperature)

- The boiler is in normal operating mode. Reference the boiler installation manual for detailed explanation of the boiler operation.

Boiler Display shows FUSE

- Check and ensure the transformer is properly connected to the MCBA module.
  - Check and ensure 24V are measured at the transformer when properly connected to the MCBA module. If necessary, replace the transformer.
- Check the internal fuse F3 by locating the control module and removing the black housing. The internal fuse F3 is located in the center of the control module as shown in Fig. 1 page 4.

See servicing tips and instructions, page 3, for accessing the internal fuses of the control module.

- If fuse F3 has blown, replace the fuse with a 4-amp/250V slow acting fuse. Check external boiler wiring for external source of 24V backfeed.

Soft Lockout Error Code

The boiler will display Soft Lockouts with a flashing “9”, then “b” as the first digit on the left of the display followed by a steady two digit code. The boiler will automatically reset a Soft Lockout once the condition has been corrected and returned to standard operating condition.

Code	Error Condition	Correcting Error Condition
b- 18	**High Temperature Limit, Boiler Supply**	If the primary boiler supply water temperature exceeds 200ºF, the burner will shut down until the supply temperature drops below 200ºF. The boiler circulator will continue operating. • This problem should only occur if the heat load demand is less than the low input-firing rate of the boiler, typically found on small single heat zones and where there is a potential flow issue. - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Prestige Installation Manual or per other approved/recognized designed configurations. • Ensure system and/or zone circulators are operating properly • Use a temperature-metering device to measure the supply water temperature leaving the boiler. Compare this measured temperature with the display temperature (INFO Mode display, “1” is the first digit on the left followed by the temperature.) - Replace the supply temperature sensor if the temperature comparison is largely varied by more than 10ºF.
b- 19	**High Temperature Limit, Boiler Return**	If the primary boiler return water temperature exceeds 200ºF, the burner will shut down until the return temperature drops below 200ºF. The boiler circulator will continue operating. • This problem rarely occurs unless the boiler experiences an Error Code 18 and the system is charged with a water temperature in excess of 200ºF - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Prestige Installation Manual or per other approved/recognized designed configurations. - Ensure the boiler piping is correct and the water flow is not reversed or pipes are cross connected. • Use a temperature-metering device to measure the return water temperature entering the boiler. Compare this measured temperature with the display temperature (**INFO** Mode display, “2” is the first digit on the left followed by the temperature.) - Replace the return temperature sensor if the temperature comparison is largely varied by more than 10ºF.

Code	Error Condition	Correcting Error Condition
b- 24	**High Temperature Limit, Boiler Supply and Return**	If the primary boiler return water temperature exceeds the boiler supply temperature, the burner will shut down until the boiler return temperature drops below the boiler supply temperature. The boiler circulator will continue operating. • The following items should be checked:. - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Prestige Installation Manual or per other approved/recognized designed configurations. - Ensure the boiler piping is correct and the water flow is not reversed or pipes are cross connected. • Use a temperature-metering device to measure the supply water temperature leaving the boiler. Compare this measured temperature with the display temperature (**INFO** Mode display, "1" is the first digit followed by the temperature.) - Replace the supply temperature sensor if the temperature comparison is largely varied by more than 10ºF. • Use a temperature-metering device to measure the return water temperature entering the boiler. Compare this measured temperature with the display temperature (**INFO** Mode display, "2" is the first digit followed by the temperature.) - Replace the return temperature sensor if the temperature comparison is largely varied by more than 10ºF.
b- 25	**High Temperature Limit, Boiler Supply**	If the primary boiler supply water temperature rate of increase is deemed too quick, the burner will shut down for a 3 minutes (MCBA 54) or 10 minute period (MCBA 14). If the condition is not corrected during the next cycle, the burner shut down period of 10 minutes will increase an additional minute. The boiler will continue for 5 cycles until a "hard" lockout will occur. • This problem will occur if the flow rate on the boiler is too low or if there is no flow. Check for the following conditions: - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Installation Manual or per other approved/recognized designed configurations. • Verify pump is properly sized for the flow rate required based on the head loss of the system. Reference the installation manual for pump curves and boiler pressure drop. Consult the circulator manufacturer for additional pump curve data or for assistance in sizing a circulator properly. • Verify and ensure the boiler space heating CH circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections.

Code	Error Condition	Correcting Error Condition
b- 25	**High Temperature Limit, Boiler Supply (continued)**	- Check and verify 120V at the 120V terminal strip along terminals 1 and 2 inside the boiler enclosure. Check circulator wire harness from the boiler to the circulator if necessary. • Verify and ensure the external DHW circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections. - Check and verify 120V at the 120V terminal strip, terminals 4 and 5 inside the boiler enclosure. Check circulator wire harness from the boiler to the circulator if necessary.
b- 26	**LWCO Device**	If the LWCO device is determined to be open by the control module the boiler will remain in a shut down mode until the condition is corrected. Once the condition is corrected the boiler will remain in the shut down mode for an additional 150 seconds before startup. - Check the pressure gauge on the boiler and ensure the system is at minimum 10 psig. - Ensure proper operation of the boiler make up system and fill valve. • Check continuity across the LWCO terminals for closed contacts if the boiler system pressure gauge reads 10 psig or greater. - Replace the LWCO device if the continuity shows an open circuit and the system pressure is 10 psig or greater. - Check the wiring and contacts from the LWCO to the control module terminals if the continuity check shows a close circuit.
b- 28	**Blower Assembly**	Will occur if during the ignition sequence the blower does not start. The boiler display will indicate a status code of 5 during the ignition sequence. • Disconnect the connector at the blower. Restart the boiler sequence and check for 35Vdc at the connector between the black and white wires (pin 1 & 5). - If 35Vdc is present at the connector, reconnect the wire harness to the blower and ensure a secure connection. Replace the blower assembly if problem is not resolved. - If 35Vdc is not present at the connector, inspect the wiring harness. Replace the wire harness, if there is any damage visible • Contact Triangle Tube Technical Support if problem is not resolved.
b- 29	**Blower Assembly**	The control module is detecting the blower in operation when it should not be. • Check and verify the wiring from the blower to the control module is correct as shown in the appliance wiring schematic, page 27 and 28. • Contact Triangle Tube Technical Support if problem is not resolved.

Code	Error Condition	Correcting Error Condition
b- 30	**High Temperature Limit, Boiler Supply and Return Temperature Differential is greater than 72°F**	If the primary boiler water temperature differential between the supply and the return is too high (greater than 72°F), the burner will shut down for a 180 seconds (MCBA 54) or 150 second (MCBA 14) period. The circulator will continue circulating until the start of the next cycle. If the condition is not corrected during the next cycle, the burner shut down period of 150 seconds will increase an additional minute. The boiler will continue for 15 cycles (MCBA 54) or 20 (MCBA 14) cycles until a "hard " lockout will occur. • This problem will occur if the flow rate and demand on the boiler is too low. Check for the following conditions: - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Installation Manual or per other approved/recognized designed configurations. - Ensure the piping system pressure drop is within the flow rate parameters of the circulator. • Verify and ensure the boiler space heating CH circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections. - Check and verify 120V at the 120V Terminal strip terminals 1 and 2 inside the boiler enclosure. Check circulator wire harness if voltage is measured at the control module. • Verify and ensure the external DHW circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections. - Check and verify 120V at the 120V terminal strip between terminals 4 and 5 inside the boiler enclosure. Check circulator wire harness and replace if needed if voltage is measured at the control module.
b- 33	**Indirect Water Heater Temperature Sensor**	The control module detects a short or jumped out condition of the indirect water heater temperature sensor. The burner will remain off until the condition is corrected. • Review parameter setting for DWH operating signal selection. Reference Prestige Control Supplement for proper selection. • Inspect the DHW temperature sensor and wiring, ensure it is secure and in good condition. - Replace the sensor if problem persists.
b- 35	**Flue Temperature Sensor**	The control module detects a short or jumped out condition of the flue temperature sensor. This code will also appear briefly prior to a "hard" lockout if the flue gas temperature exceeds 250°F. The burner will remain off until the condition is corrected. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition.

Soft Lockout Error Code

Code	Error Condition	Correcting Error Condition
b- 38	**Indirect Water Heater Temperature Sensor**	The control module detects the indirect water heater temperature sensor as "open" which is typically an improper or missing connection of the sensor. - Review parameter setting for DHW operating signal selection. Reference Prestige Control Supplement for proper selection. • Inspect the DHW temperature sensor and wiring, ensure it is secure and in good condition. - Replace the sensor if problem persists.
b- 40	**Flue Temperature Sensor**	The control module detects the flue temperature sensor as "open", which is typically an improper or missing connection at the sensor. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition. - Replace the sensor if problem persists.
b- 52	**Flue Temperature Sensor**	The control module detects the flue temperature greater than 241ºF, less than 250ºF. Burner off for 150 seconds. • This is an indication the heat exchanger flue ways may need cleaning. Reference the Maintenance section of the installation manual for procedures on cleaning the flue side of the heat exchanger. • Isolate the boiler from the boiler system piping and drain the boiler heat exchanger. Flush the boiler heat exchanger several times, checking the discharge water for signs of scale or sediment. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition, replace as needed. - Replace the sensor if problem persists.
b- 65	**Blower Assembly**	The control module does not detect proper blower operation during a call for heat. • Disconnect the 35Vdc connector at the blower. Restart the boiler sequence and check for 35Vdc at the connector between the black and white wires (pin 1 & 5). - If 35Vdc is present at the connector, reconnect the wire harness to the blower and ensure a secure connection. Replace the blower assembly if problem is not resolved. - If 135Vdc is not present at the connector, inspect the wiring harness. Replace the wire harness if the inspection reveals any signs of damage. - Contact Triangle Tube Technical Support if problem is not resolved
b- 116	**Incoming Voltage Frequency**	The control module requires an incoming voltage of 120V and a frequency of 60 Hz. • If the incoming voltage is being supplied by a generator or alternative source, check the frequency supplied and adjust accordingly.
b- 118	**Flame Current Signal Lost**	- Contact Triangle Tube Technical Support for further assistance.

Hard Lockout Error Code

The boiler will display a Hard Lockout with an **E** as the first digit on the left of display followed by a two-digit code. The boiler must be manually reset by pressing the RESET button on the display once the condition has been corrected. A Hard Lockout will occur when boiler conditions, that are considered critical in terms of safety, are not met or exceeded.

Code	Error Condition	Correcting Error Condition
E- 00	**Flame Detection Error**	This error will occur if the control module detect a burner flame (flame signal) prior to the ignition sequence. • This problem maybe related to the burner operating too hot due to poor combustion. The flame pattern and combustion should be tested at both high fire and low fire inputs. Reference page 5 regarding high and low fire input procedures. Reference page 20 for combustion requirements. - If the application is propane, check and verify the propane orifice for proper size (reference page 20 for orifice sizes). Ensure the propane orifice is properly seated in the gas valve gasket. • Inspect the burner head through the burner sight port during shut down sequence of the boiler. - If the flame remains after the shut down sequence, the gas valve maybe leaking. Check and verify the gas pressure is less than 13 inches w.c. If the gas pressure is less than 13 inches w.c., replace the gas valve.
E- 02	**Failed Ignition Error**	This error will occur if the boiler has failed to establish flame detection during the ignition sequence. The lockout will occur after 5 tries. • If no ignition spark occurs during the ignition sequence: - Check the ignition electrode cable, the electrode boot connector and all connections, ensure all are in good condition and tightly secure. Replace cable if damaged. - Inspect the insulation of the electrode cable and the electrode igniter; ensure there is no damage. Replace cable or igniter as needed. - Check the ground lead for a secure connection from the control module ground to the burner mounting plate. Use a ground continuity check to verify a good ground. • If there is an ignition spark during the ignition sequence, but no flame: - Verify the manual shutoff valve on the gas supply piping is in the OPEN position. - Check and verify the gas pressure at the inlet of the valve during ignition sequence. Ensure the gas pressure maintains a minimum 5 inches w.c during ignition sequence. **Note**: All gas appliances within the building should be operating during this measurement. - Check and verify all gas piping is free of obstructions and has been purged of all air. - Check the gas meter for indications of gas flow during the ignition sequence. - Remove the ignition electrode to inspect for damage. Clean any white oxides off the electrode if necessary. Replace the electrode if damaged or will not clean. - Replace the gas valve rectifier cable. - Remove and inspect the gas valve and venturi gas ports. Ensure ports are free of obstructions. - If the above items have been completed and verified, Triangle Tube Technical Support for additional assistance.

Code	Error Condition	Correcting Error Condition
E- 02	**Failed Ignition Error (continued)**	• On LP applications the incoming gas regulator should be installed as follows: - Size the regulator for the appropriate flow. - The regulator diaphrm should be installed horizontally - The piping before and after the regulator should be straight rigid pipe for a minimum of 10 pipe diameters. - It's best practice to avoid flexible pipe between boiler and the outlet of the regulator. - If regulator is installed and vented inside, if local codes allow, a vent limiter should be used. - If regulator is installed or vented outside a vent limiter should not be used and inverted trap piping arrangement should be used to vent the diaphram. • Flame is established during the ignition sequence, but not maintained. This problem may be due to low flame signal detection by the control module. - Inspect the flame pattern on the burner head during high and low fire inputs. Inspect and clean the burner head if necessary. Replace the burner head if damaged. Reference page 5 regarding high and low fire input procedures. - Check the input rate of the boiler at the gas meter during high fire input. If the gas meter measured rate is not at or below 15% of the boiler rating, replace the gas valve. **Note**: The length of venting and combustion air piping will affect the measure boiler rating. - Check the ground lead for a secure connection from the control module ground to the burner mounting plate. Use a ground continuity check to verify a good ground. - Remove the ignition electrode to inspect for damage. Clean any white oxides off the electrode if necessary. Replace the electrode if damaged or will not clean.
E- 03	**Gas Valve Harness**	• Ensure gas valve rectifier cable is properly connected to the gas valve and secured. Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, replace the rectifier cable.
E- 04	**Loss of Power**	This error will occur if power to the boiler is lost after a lockout has occurred. The boiler must be manually reset and the original lockout code will be lost. • This error will also occur if the service technician tries to reset a hard lockout by turning the boiler OFF and then ON as an attempt to reset the boiler. • Verify polarity and proper ground on incoming 120V power connections • This error may occur in rare cases if there is power interruption, surge or "Dirty" voltage. A relay kit is available and may be installed on the incoming voltage to the boiler.

Hard Lockout Error Code

Code	Error Condition	Correcting Error Condition
E- 05	**Internal Failure**	This error may occur due to a short in either the ignition cable or display panel. • Check flat ribbon cable to display for short. • Check for moisture at display and repair cause of moisture, dry and/or replace display. • Inspect ignition cable replace if necessary. • Reset the boiler control module and retry ignition sequence and boiler operation. • If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 06	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 07	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 08	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 09	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 11	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 12	**External Limit Lockout**	• An external limit control connected at the 24V terminal strip, between terminals 13 and 14 is open, breaking the circuit. Determine reason for the limit to be open and correct condition. - If no external limit is used, then check and verify connection of the factory applied jumper across terminals 13 and 14. - If the external limit is closed, then check the boiler internal wiring connections and repair or replace if necessary. Remove the external limit and apply a temporary jumper across terminals 13 and 14 and verify operation.
E- 13	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 14	**Low Voltage Internal Short or Voltage Backfeed**	This error may be due to a short or voltage feedback in the 24V circuit. • Check the wiring of the outdoor sensor - Ensure the wiring is not locate near high voltage wiring. Relocate the wiring or use shielded cable. • Check for backfeed of voltage to terminals 7 and 8, terminals 11 and 12 and terminals 17 and 18 in the boiler enclosure.

Code	Error Condition	Correcting Error Condition
E- 14	**Low Voltage Internal Short or Voltage Backfeed (continued)**	- Remove all field wiring from the boiler's and reset the boiler control module. - Initiate a call for heat external to the boiler and check for voltage on field wiring to terminals 7 and 8 (CH heating) and terminals 11 and 12 (DHW heating). • Check for the line voltage being supplied to the boiler for polarity and for 120 VAC. Ensure the voltage to the boiler is a dedicated line and there is no drop in voltage at any time. • Check moisture on and around the low voltage terminal strip of the boiler. If moisture is present use a hair dryer or some other means to dry the terminals trip. • If moisture is present in the boiler, check for possible moisture on the display. If there are signs of moisture or corrosion, resolve the moisture issue and replace the display panel. • If the application is using an IDWH other than a SMART Tank, check the aquastat being used. A large majority of applications experiencing E-14 were using a honeywell L4000 series aquastat. - Isolate the IDWH aquastat from the boiler terminals 11 and 12 using an isolation relay. - Replace the aquastat using Triangle Tube's PSRKIT22, IDWH Sensor Kit. Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 15	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 16	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 17	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 18	**High Temperature Limit, Supply Temperature**	This error will occur if the boiler supply water temperature exceeds 212ºF. • The following items should be checked:. - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Installation Manual or per other approved/recognized designed configurations. • Use a temperature-metering device to measure the supply water temperature leaving the boiler. Compare this measured temperature with

Code	Error Condition	Correcting Error Condition
E- 18	**High Temperature Limit, Supply Temperature (continued)**	the display temperature (**INFO** Mode display, "1" is the first digit followed by the temperature.) - Replace the supply temperature sensor if the temperature comparison is largely varied by more than 10ºF.
E- 19	**High Temperature Limit, Return Temperature**	This error will occur if the boiler return water temperature exceeds 212ºF. • This problem rarely occurs unless the boiler experiences an Error Code 18 and the system is charged with a water temperature in excess of 212ºF. The following items should be checked: - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Installation Manual or per other approved/recognized designed configurations. - Ensure the boiler piping is correct and the water flow is not reversed or pipes are cross-connected. • Use a temperature-metering device to measure the return water temperature leaving the boiler. Compare this measured temperature with the display temperature (**INFO** Mode display, "2" is the first digit followed by the temperature.) - Replace the return temperature sensor if the temperature comparison is largely varied by more than 10ºF.
E- 24	**Low Voltage Internal Short or Voltage Backfeed**	This error may be due to a short or voltage feedback in the 24V circuit. • Check the line voltage being supplied to the boiler for polarity and 120VAC. Ensure the voltage to the boiler is a dedicated line and there is no drop in voltage at any time. - Check condition of voltage is supplied from "OFF-GRID" source. • Check for moisture on and around the low voltage Terminal strip on the boiler. If moisture is present use a hair dryer or some other means to dry the Terminal strip. • If moisture is present in the boiler, check for possible moisture on the display. If there are signs of moisture or corrosion, resolve the moisture issue and replace the display panel. • Check for backfeed of voltage to Terminals 7 and 8, Terminals 11 and 12 and Terminals 17 and 18 in the boiler enclosure. - Remove all field wiring from the boiler's and reset the boiler control module. - Initiate a call for heat external to the boiler and check for voltage on field wiring ro terminals 7 and 8 (CH heating) and terminals 11 and 12 (DHW heating). Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.

Hard Lockout Error Code

Code	Error Condition	Correcting Error Condition
E- 25	**High Temperature Limit, Supply Temperature Rate of Increase**	This error will occur if the boiler supply water temperature rate of increase is deemed too rapid. The control module will display a soft lockout of **b_25** and initiate a recycle sequence. After 5 cycles the boiler will go into a hard lockout. • This problem will occur if the flow rate and demand load on the boiler are too low. Check for the following conditions: - Verify the boiler and heating system are filled with water and the LWCO is operating properly. - Ensure the boiler and heating system have been properly purged and there is no entrapped air. - Inspect and verify heating system piping and its components. Ensure piping is per the recommendations given in the Installation Manual or per other approved/recognized designed configurations. • Verify and ensure the boiler central heating CH circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections. - Check and verify 120V at the 120v terminal strip terminals 1 and 2 inside the boiler enclosure. Check circulator wire harness and replace if needed if voltage is measured at the control module. • Verify and ensure the external DHW circulator is operating properly. - Check and verify 120V at the circulator wiring in the circulator junction box. If no voltage is measured, check circulator wiring and connections. - Check and verify 120V at the 120V terminal strip between terminals 4 and 5 inside the boiler enclosure. Check circulator wire harness and replace if needed, if voltage is measured at the control module. • Verify pump is properly sized for the flow rate required based on the head loss of the system. Reference the installation manual for pump curves and boiler pressure drops. Consult the circulator manufacturer for additional pump curve data or for assistance in sizing a circulator properly.
E- 28	**Blower Assembly**	This error will occur if during the ignition sequence the blower does not start. The boiler display will indicate a status code of 5 during the ignition sequence for 4 minutes before locking out. • Disconnect the connector at the blower. Restart the boiler sequence and check for 35Vdc at the connector between the black and white wires (pin 1& 5). - If 35Vdc is not present at the connector, inspect the wiring harness and replace if necessary. Replace the control module if wire harness replacement does not resolve the problem. - If 35Vdc is present at the connector, reconnect the wire harness to the blower and ensure a secure connection. If problem is not resolved, contact Triangle Tube Technical Support for additional assistance.

Hard Lockout Error Code

Code	Error Condition	Correcting Error Condition
E- 29	**Blower Assembly**	The control module is detecting the blower in operation when it should not be. • Check and verify the wiring from the blower to the control module is correct as shown in the appliance wiring schematic, pages 27-28. - Replace the wiring harness from the control module to the blower. Replace the blower if the replacement of the wiring harness does not resolve the problem. If problem is not resolved, contact Triangle Tube Technical Support for additional assistance.
E- 31	**Boiler Supply Temperature Sensor**	The control module detects a short or jumped out condition of the boiler supply (outlet) temperature sensor. • Inspect the boiler supply temperature sensor and wiring, ensure it is secure and in good condition, replace as needed. - Replace the sensor and wiring if problem persists.
E- 32	**Boiler Return Temperature Sensor**	The control module detects a short or jumped out condition of the boiler return (inlet) temperature sensor. • Inspect the boiler return temperature sensor and wiring, ensure it is secure and in good condition, replace as needed. - Replace the sensor and wiring if problem persists.
E- 35	**Flue Temperature Sensor**	The control module detects a short or jumped out condition of flue temperature sensor. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition. - Replace the sensor and wiring if problem persists.
E- 36	**Boiler Supply Temperature Sensor**	The control module detects the boiler supply (outlet) temperature sensor as an open circuit. • Inspect the boiler supply temperature sensor and wiring, ensure it is secure and in good condition, replace as needed.
E- 37	**Boiler Return Temperature sensor**	The control module detects the boiler return (inlet) temperature sensor as an open circuit. • Inspect the boiler return temperature sensor and wiring, ensure it is secure and in good condition, replace as needed.
E- 40	**Flue Temperature Sensor**	The control module detects the flue temperature sensor as “open”, which is typically an improper or missing connexion at the sensor. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition. - Replace the sensor if problem persists.
E- 44	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.

Hard Lockout Error Code

Code	Error Condition	Correcting Error Condition
E- 52	**Flue Temperature Sensor**	The control module detects the flue temperature exceeding the 250ºF limitation of the boiler. • This is an indication the heat exchanger flue ways may need cleaning. Reference the Maintenance section of the installation manual for procedures on cleaning the flue side of the heat exchanger. • Isolate the boiler from the boiler system piping and drain the boiler heat exchanger. Flush the boiler heat exchanger several times, checking the discharge water for signs of scale or sediment. • Inspect the flue temperature sensor and wiring, ensure it is secure and in good condition, replace as needed.
E- 60	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 61	**Internal Failure**	Reset the boiler control module and retry ignition sequence and boiler operation. If problem continues, contact Triangle Tube Technical Support for additional assistance.
E- 65	**Blower Assembly**	The control module does not detect proper blower operation during a call for heat. • Disconnect the 35V dc connector at the blower. Restart the boiler sequence and check for 35Vdc at the connector between the black and white wires (pin 1 & 5). - If 35Vdc is present at the connector, reconnect the wire harness to the blower and ensure a secure connection. Replace the blower assembly if problem is not resolved. - If 35Vdc is not present at the connector, inspect the wiring harness for any visible signs of damage. If the wire harness inspection does not resolve the problem, contact Triangle Tube Technical Support for additional assistance.

WARNING

The installation and startup of the PRESTIGE should be performed by a qualified installer / service technician. The startup procedures should include a complete combustion test. The complete combustion test must also be performed after any adjustments to the factory settings on the burner. Failure to comply with these requirements can result in severe personal injury, death or substantial property damage.

Combustion Test Guidelines

- The combustion test should be conducted using an electronic combustion analyzer or at a minimum a “Fyrite” type CO2 analyzer.
- The combustion test sample can be taken from the test port located on the vent adapter of the PRESTIGE.
- Ensure the vent and combustion air piping are completely installed prior to startup and conducting a combustion test.
- The combustion test should be conducted, at a minimum, when the unit is at high fire input.

Combustion Parameters
Combustion Adjustment

	Natural Gas All Models	Propane All Models	Propane Solo 399 Only
O2 Min	2.30%	2.70%	3.70%
O2 Max.	5.30%	4.70%	5.20%
CO2 Min	8.80%	10.70%	10.00%
CO2 Max	10.50%	12.00%	11.00%
CO Max	100 ppm	100 ppm	100 ppm

Gas Valve Orifices

Model	Orifice Size Natural Gas	Orifice Size Propane Gas
Solo 60	0.204" (5.2 mm)	0.120" (3.1 mm)
Solo 110	None required	0.204" (5.2 mm)
Excellence 110	None Required	0.204" (5.2 mm)
Solo 175	None Required	0.221" (5.6 mm)
Solo 250	None Required	0.250" (6.3 mm)
Solo 399	0.399" (8.6 mm)	0.264" (6.7 mm)

WARNING

To perform the following procedure it is essential the service technician reads and follows the procedures closely. After any adjustments are completed it is essential to perform a combustion check before proceeding with further steps. Failure to comply with these procedures can result in personal injury, death or substantial property damage.

If the O2 level measured during the combustion test is below 2.3% for natural or 2.7% for propane:

OR

If the CO2 level measured during the combustion test is above 10.5% for natural or 12.0% for propane:

Adjust the gas valve throttle screw, as shown in figure 2A or in Fugre 2B as follows:

1. Ensure the PRESTIGE is OFF and no “calls for heat” are initiated.
2. Using a flat head screwdriver, turn the throttle screw clockwise (inward). It is important to note the initial start point of the screw prior to any adjustments.
3. Place the PRESTIGE back into service and conduct a combustion test.
4. If necessary, repeat the adjustment steps until the desired combustion level is met.

WARNING

Adjusting the throttle screw in Figure 2A clockwise (inward) decreases the volume of gas injected into the burner. Adjustments beyond 1 full turn clockwise will greatly affect the operation of the burner and result in unstable combustion conditions.

WARNING

DO NOT adjust the throttle screw in FIgure 2A counter-clockwise beyond the initial factory set point and DO NOT make any throttle screw adjustment in Figure 2B without the use of proper equipment (manometer, combustion analyzer..) and/or the consultation with the Tech Services at Triangle Tube. Adjustments counter-clockwise beyond the factory set point will increase the volume of gas injected into the burner, resulting in possible unstable combustion conditions and potential dangerous levels of CO.

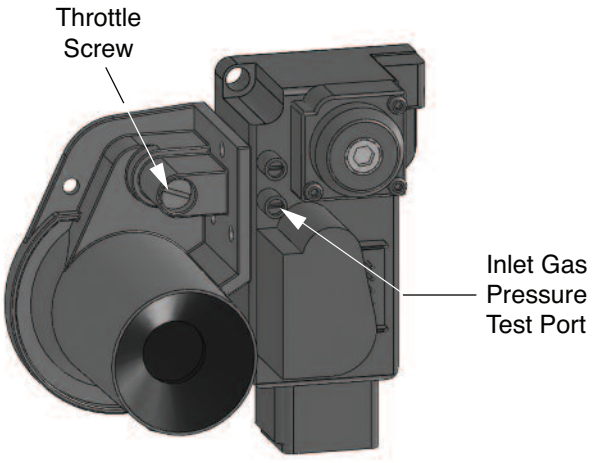


Fig. 2A Gas Valve/Venturi Assembly for Prestige 60, 110, 175 and 250 and Excellence 110

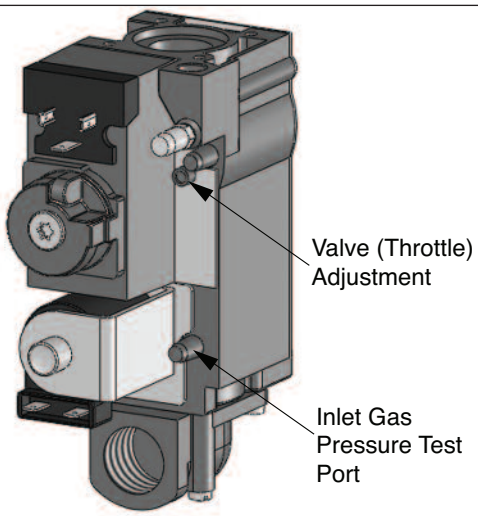


Fig. 2B Gas Valve for Prestige 399

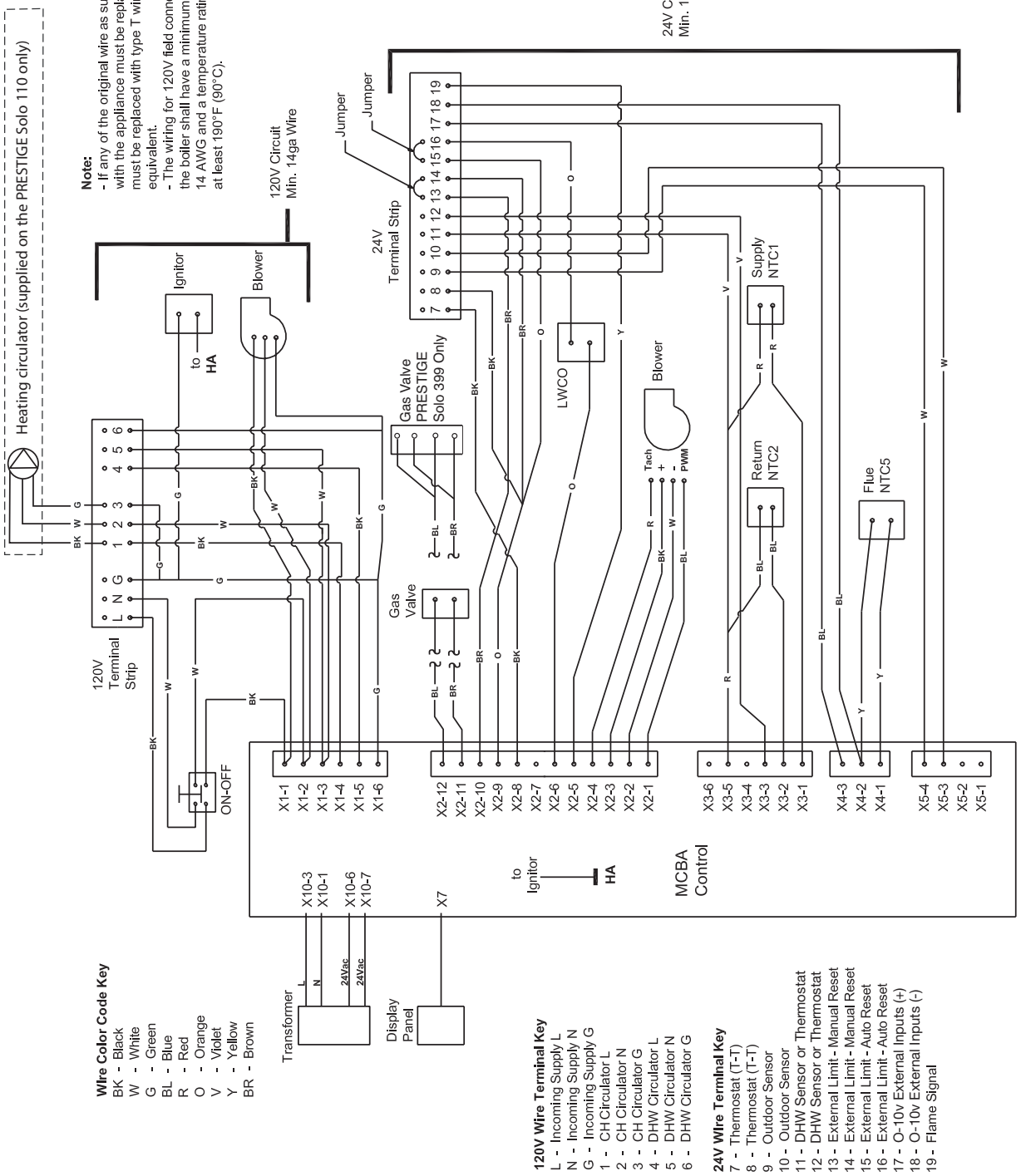
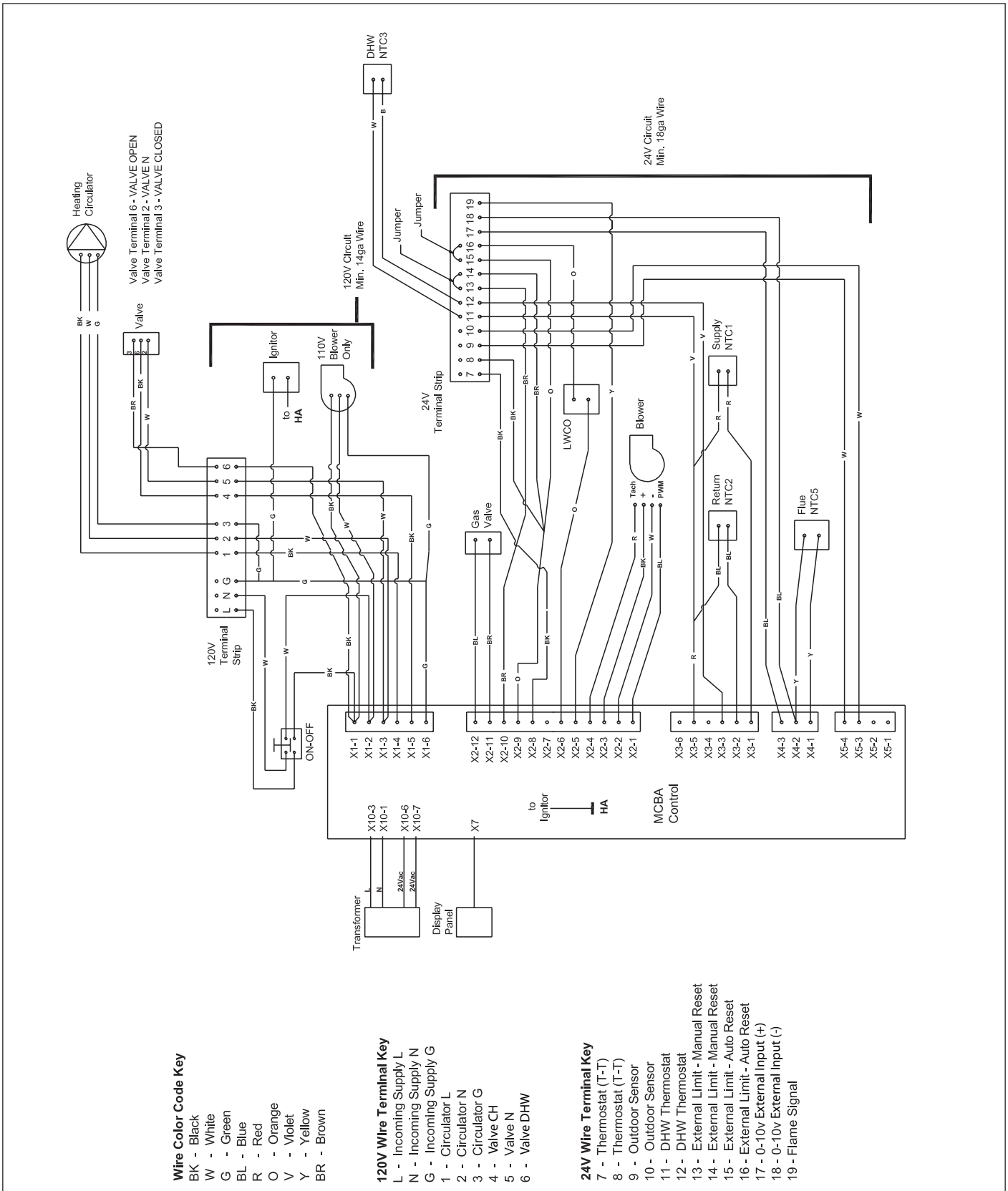

Heating circulator (supplied on the PRESTIGE Solo 110 only)
Note:
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with type T wire or it's equivalent.
- The wiring for 120V field connections to the boiler shall have a minimum size of 14 AWG and a temperature rating of at least 190°F (90°C).
120V Circuit Min. 14ga Wire
24V Circuit Min. 18ga Wire
Jumper
Jumper
24V Terminal Strip
7 8 9 10 11 12 13 14 15 16 17 18 19
Ignitor
to HA
Blower
Gas Valve PRESTIGE Solo 399 Only
LWCO
Blower
Tach
+
-
PWM
Supply NTC1
Return NTC2
Flue NTC5
Gas Valve
120V Terminal Strip
L N G 1 2 3 4 5 6
ON-OFF
X1-1 X1-2 X1-3 X1-4 X1-5 X1-6
X2-12 X2-11 X2-10 X2-9 X2-8 X2-7 X2-6 X2-5 X2-4 X2-3 X2-2 X2-1
X3-6 X3-5 X3-4 X3-3 X3-2 X3-1
X4-3 X4-2 X4-1
X5-4 X5-3 X5-2 X5-1
X10-3 X10-1 X10-6 X10-7 X7
to Ignitor
HA
MCBA Control
Transformer
L
N
24Vac
24Vac
Display Panel
Wire Color Code Key
BK - Black
W - White
G - Green
BL - Blue
R - Red
O - Orange
V - Violet
Y - Yellow
BR - Brown
120V Wire Terminal Key
L - Incoming Supply L
N - Incoming Supply N
G - Incoming Supply G
1 - CH Circulator L
2 - CH Circulator N
3 - CH Circulator G
4 - DHW Circulator L
5 - DHW Circulator N
6 - DHW Circulator G
24V Wire Terminal Key
7 - Thermostat (T-T)
8 - Thermostat (T-T)
9 - Outdoor Sensor
10 - Outdoor Sensor
11 - DHW Sensor or Thermostat
12 - DHW Sensor or Thermostat
13 - External Limit - Manual Reset
14 - External Limit - Manual Reset
15 - External Limit - Auto Reset
16 - External Limit - Auto Reset
17 - O-10v External Inputs (+)
18 - O-10v External Inputs (-)
19 - Flame Signal

Fig. 3: Prestige SOLO Boiler Factory Wiring



Wire Color Code Key
BK - Black
W - White
G - Green
BL - Blue
R - Red
O - Orange
V - Violet
Y - Yellow
BR - Brown

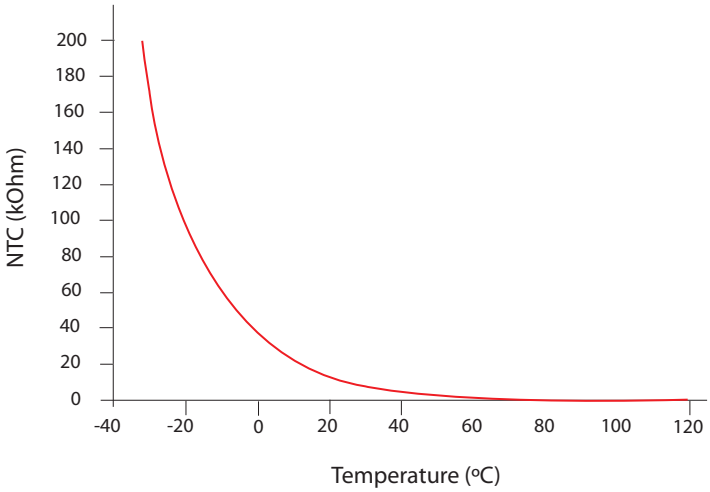
120V Wire Terminal Key
L - Incoming Supply L
N - Incoming Supply N
G - Incoming Supply G
1 - Circulator L
2 - Circulator N
3 - Circulator G
4 - Valve CH
5 - Valve N
6 - Valve DHW

24V Wire Terminal Key
7 - Thermostat (T-T)
8 - Thermostat (T-T)
9 - Outdoor Sensor
10 - Outdoor Sensor
11 - DHW Thermostat
12 - DHW Thermostat
13 - External Limit - Manual Reset
14 - External Limit - Manual Reset
15 - External Limit - Auto Reset
16 - External Limit - Auto Reset
17 - 0-10v External Input (+)
18 - 0-10v External Input (-)
19 - Flame Signal

Fig. 4: Prestige EXCELLENCE 110 Boiler Factory Wiring

NTC Sensor Resistance Curve

Temperature (°F)	Temperature (°C)	NTC (kOhm)
-22	-30	171.70
-4	-20	98.82
14	-10	58.82
32	0	36.10
50	10	22.79
68	20	14.77
78	25	12.00
86	30	9.81
104	40	6.65
122	50	4.61
140	60	3.25
158	70	2.34
176	80	1.71
194	90	1.27
212	100	0.95



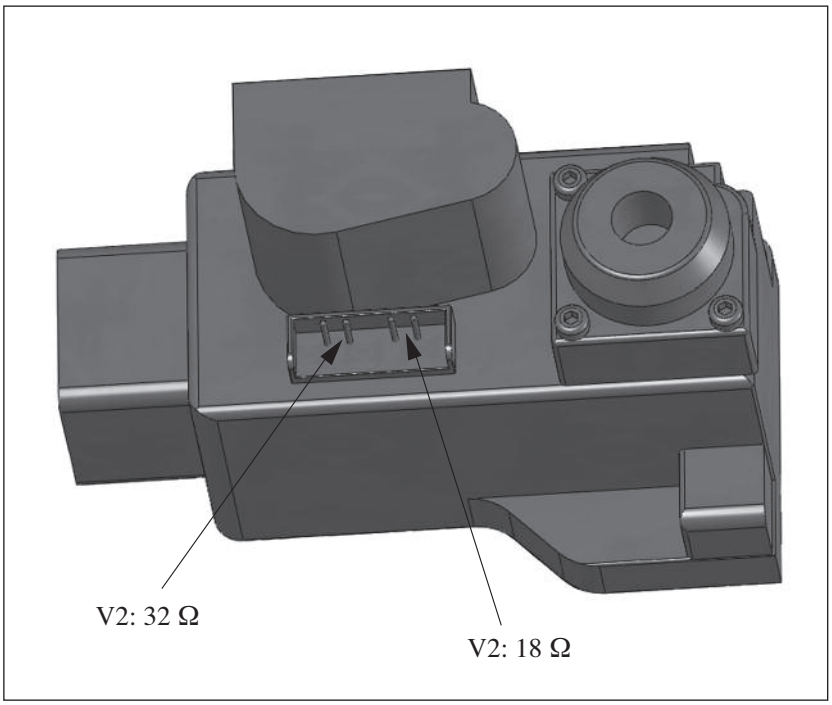


Fig. 5: Gas Valve Solenoid Coil Resistance - Prestige Solo 60, 110, 175, 250 and Excellence 110

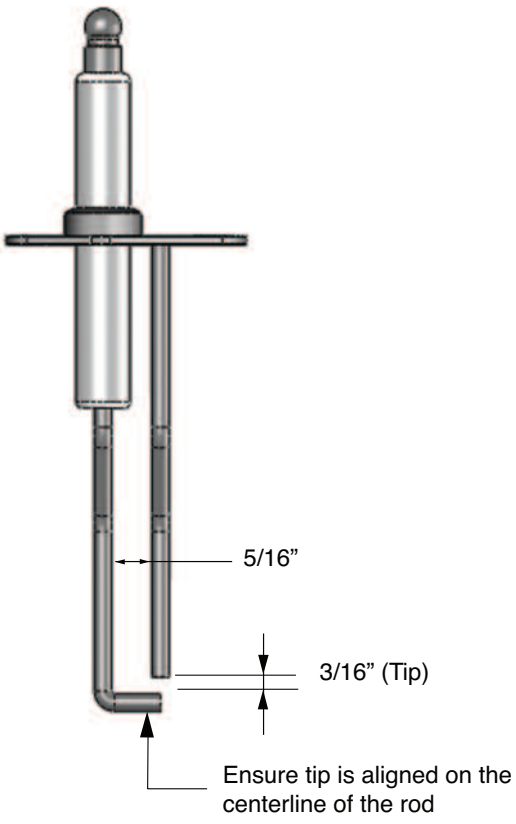


Fig. 6: Igniter Spark Gap Adjustment

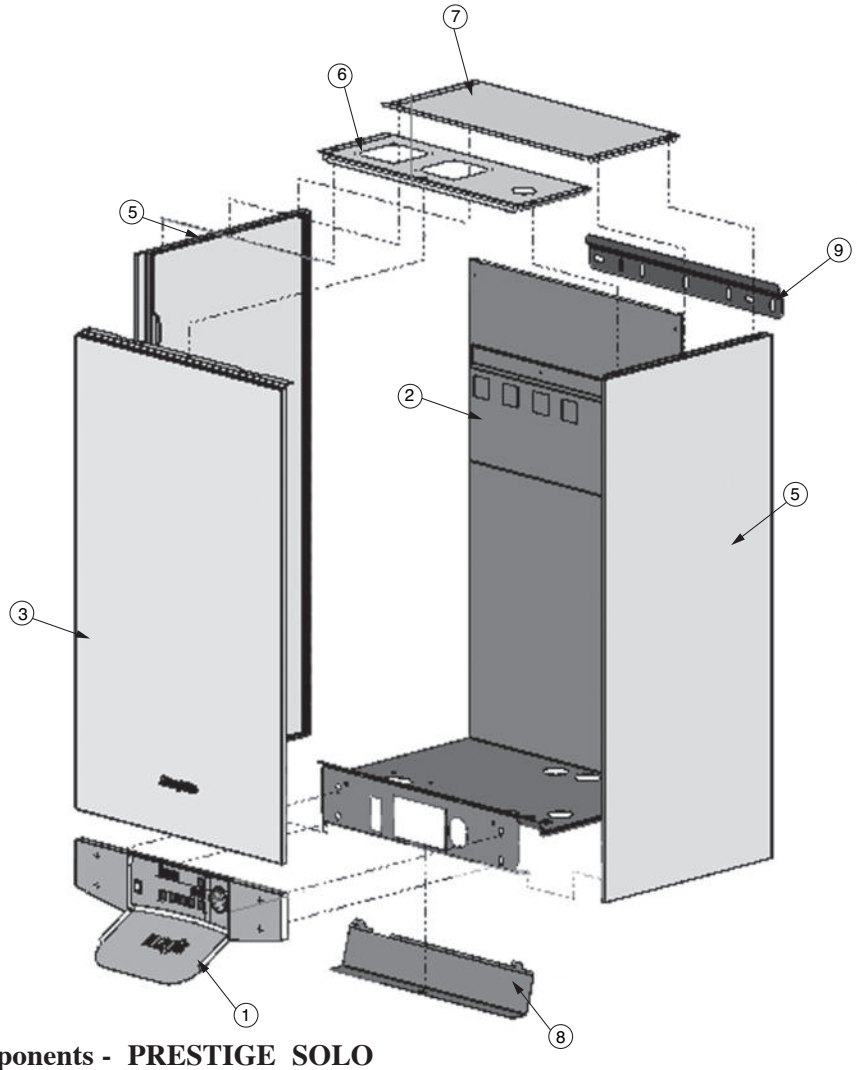


Fig. 7: Jacket Components - PRESTIGE SOLO

Item	Part # PRESTIGE Solo 60/110	Part # PRESTIGE Solo 175/250	Part # PRESTIGE Solo 399	Description
1	PSCS01			Display/Control Panel
1A	--	--	PSCS02 (Left) PSCS03 (Right)	Display/Control Panel Extensions (Not Shown)
2	PSJKT01B	PSJKT03B	PSJKT04B	Base Panel
3	PSJKT01F		PSJKT02F	Front Jacket Panel
5	PSJKT02S		PSJKT03S	Side Jacket Panel (Left and Right)
6	PSJKT01T	PSJKT03T	PSJKT05T	Top Jacket Panel
7	PSJKT02T	PSJKT04T	PSJKT06T	Top Jacket Access Panel
8	PSJKT03		PSJKT04	Control Cover Panel
9	PSRKIT21			Wall Mounting Bracket with Hardware

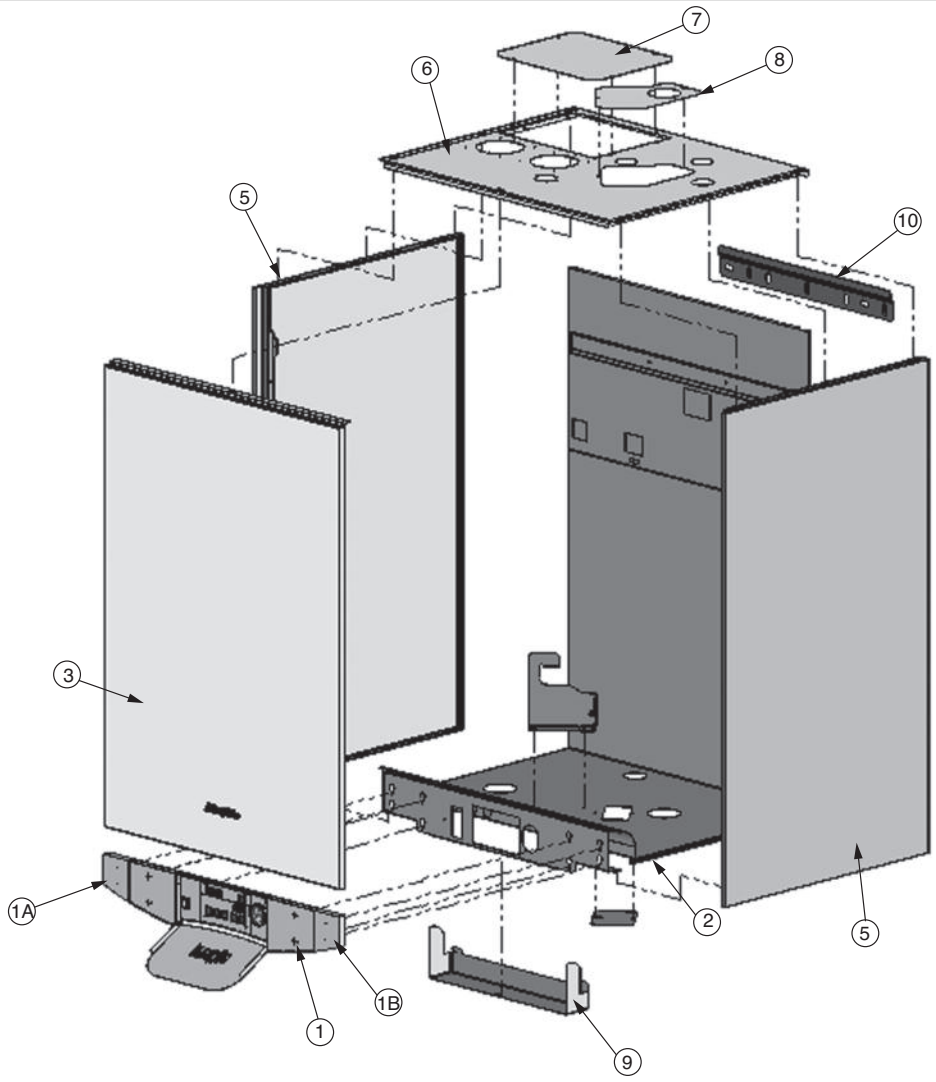


Fig. 8: Jacket Components - PRESTIGE EXCELLENCE

Item	Part No.	Description
1	PSCS01	Display/Control Panel
1A / 1B	PSCS02 / PSCS03	Display/Control Panel Extension - Left and Right
2	PEJKT01B	Base Panel
3	PSJKT02F	Front Jacket Panel
5	PSJKT03S	Side Jacket Panel (Left and Right)
6	PEJKT01T	Top Jacket Panel
7	PEJKT02T	Top Jacket Panel - Blower Access
8	PEJKT03T	Top Jacket Panel - IDWH Access
9	PSJKT04	Control Cover Panel
10	PSRKIT21	Wall Mounting Bracket with Hardware

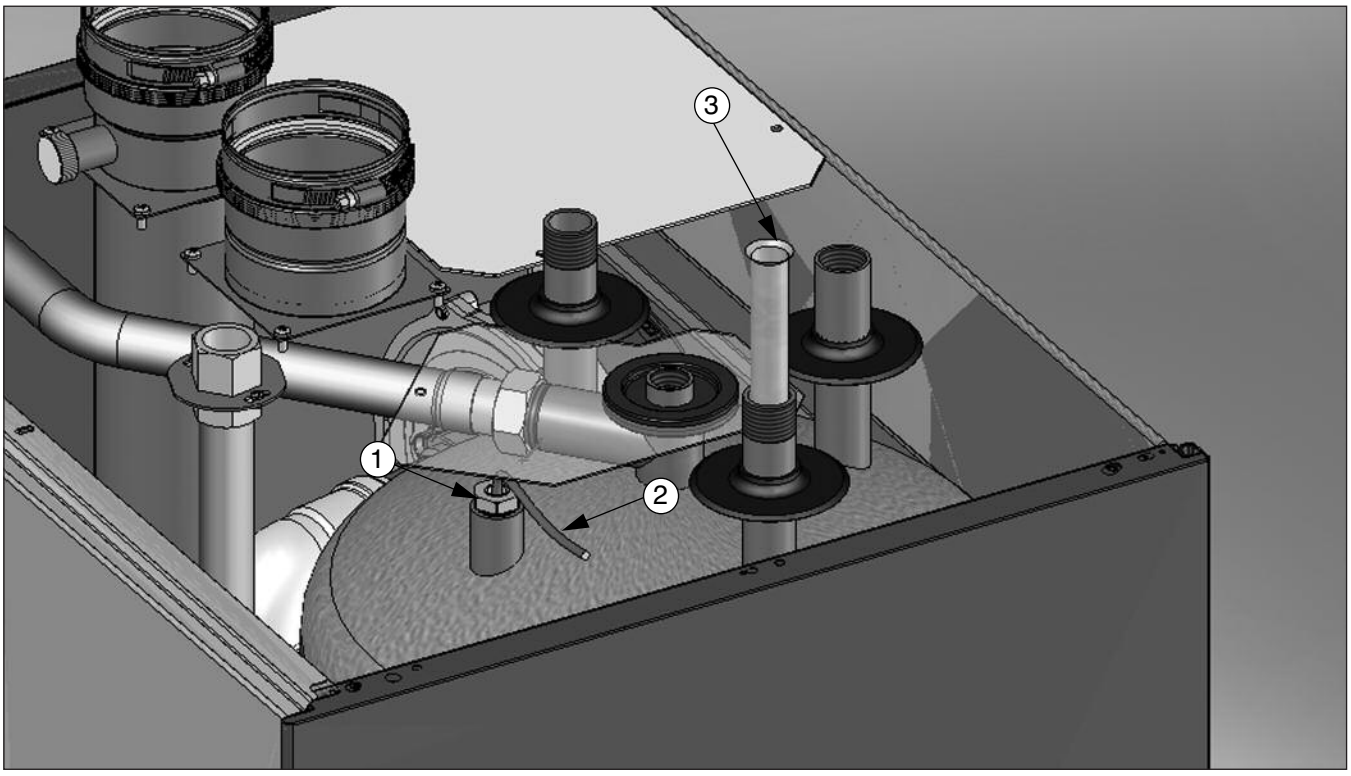


Fig. 9: Domestic Components - PRESTIGE EXCELLENCE

Item	Part No.	Description
1	P3DW05	Drywell
2	PSRKIT63	NTC 3 DHW Water
3	P3WKITDT01	Dip Tube

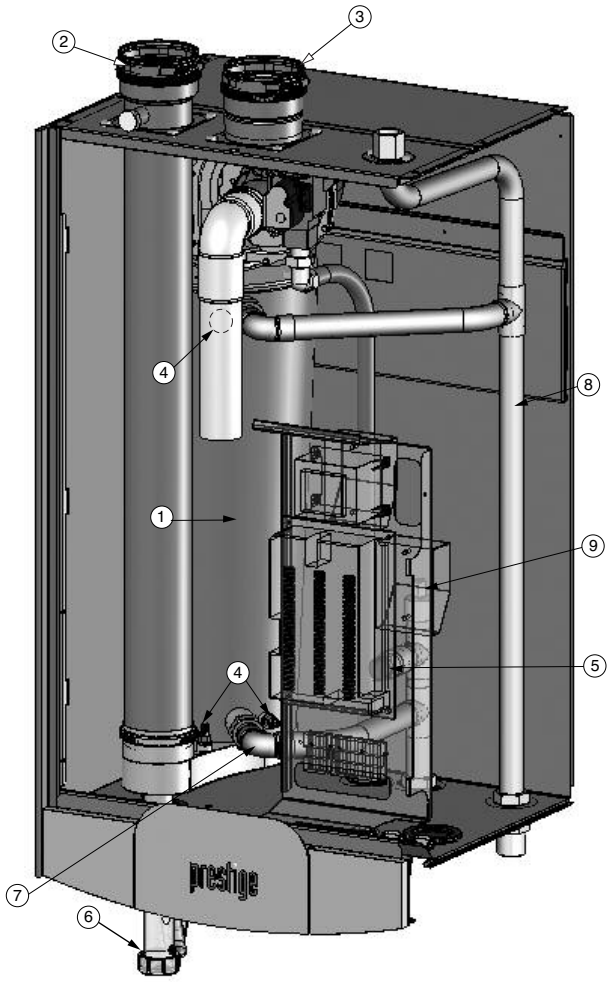


Fig. 10: Internal Components - PRESTIGE 60

Item	Part No.	Description
1	PSRKIT01	Heat Exchanger Body
2	PSRKIT02	Vent Outlet Adapter
3	PSRKIT03	Combustion Air Inlet Adapter
4	PSRKIT04	NTC Sensor (NTC1, NTC2 and NTC5)
5	PGRKIT20	LWCO Pressure Device
6	PSRKIT05	Condensate Drain Assembly
7	PSRKIT06	Boiler Piping - Return Assembly
8	PSRKIT52	Boiler Piping - Supply Assembly
9	PSRKIT17	Pressure Gauge and Fitting

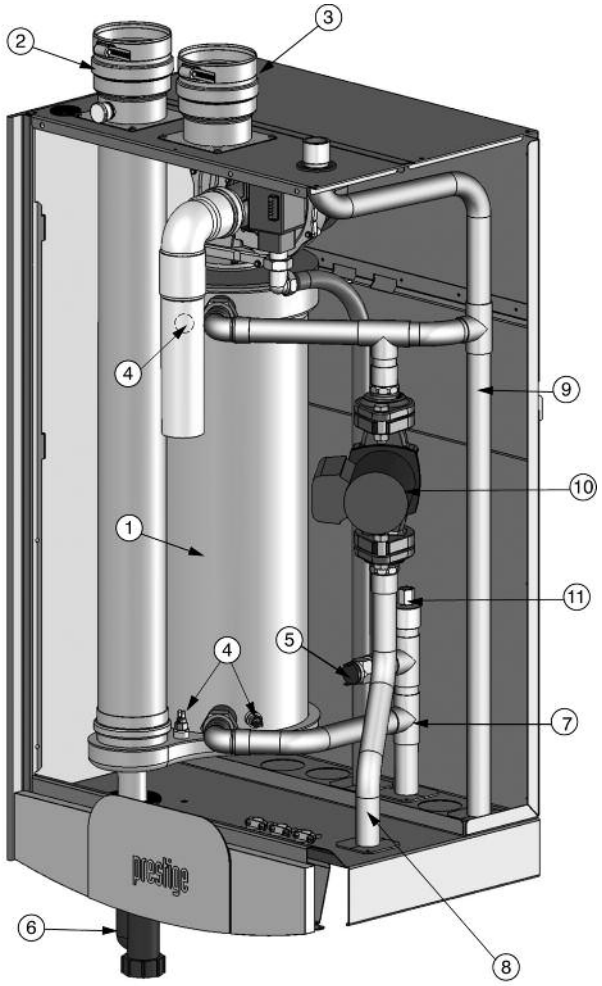


Fig. 11: Internal Components - PRESTIGE 110

Item	Part No. PRESTIGE 110	Description
1	PSRKIT01	Heat Exchanger Body
2	PSRKIT02	Vent Outlet Adapter
3	PSRKIT03	Combustion Air Inlet Adapter
4	PSRKIT04	NTC Sensor (NTC1, NTC2 and NTC5)
5	PGRKIT20	LWCO Pressure Device
6	PSRKIT05	Condensate Drain Assembly
7	PSRKIT06	Boiler Piping - Return Assembly
8	PSRKIT07	Boiler Piping - Supply Short Assembly
9	PSRKIT08	Boiler Piping - Supply Long Assembly
10	HMCIR01	Circulator
11	PSRKIT17	Pressure Gauge and Fitting

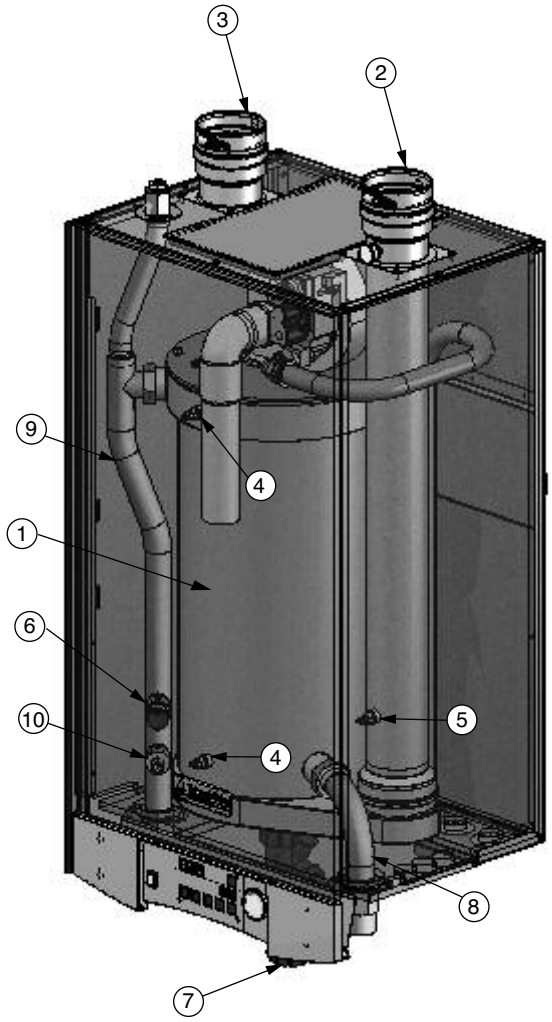


Fig. 12: Internal Components - PRESTIGE 175/250

Item	Part No. PRESTIGE 175/250	Description
1	PSRKIT25	Heat Exchanger Body Solo 175
	PSRKIT26	Heat Exchanger Body Solo 250
2	PSRKIT27	Vent Outlet Adapter
3	PSRKIT03	Combustion Air Inlet Adapter
4	PSRKIT04	Supply & Return NTC Sensor (NTC1, NTC2)
5	PSRKIT34	Flue NTC Sensor (NTC5)
6	PGRKIT20	LWCO Pressure Device
7	PSRKIT05	Condensate Drain Assembly
8	PSRKIT28	Boiler Piping - Return Assembly
9	PSRKIT29	Boiler Piping - Supply
10	PSRKIT17	Pressure Gauge and Fitting

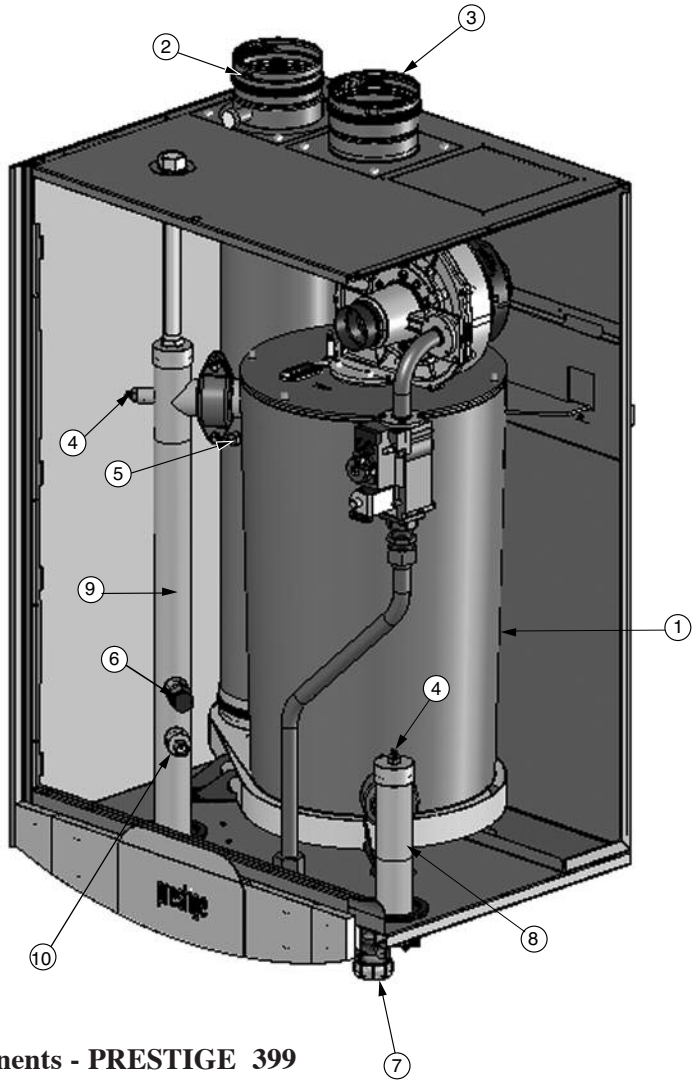


Fig. 13: Internal Components - PRESTIGE 399

Item	Part No. PRESTIGE 399	Description
1	PSRKIT44	Heat Exchanger Body
2	PSRKIT45	Vent Outlet Adapter
3	PSRKIT46	Combustion Air Inlet Adapter
4	PSRKIT47	Supply & Return NTC Sensor (NTC1, NTC2)
5	PSRKIT34	Flue NTC Sensor (NTC5)
6	PGRKIT20	LWCO Pressure Device
7	PSRKIT05	Condensate Drain Assembly
8	PSRKIT48	Boiler Piping - Return Assembly
9	PSRKIT49	Boiler Piping - Supply Assembly
10	PSRKIT17	Pressure Gauge and Fitting

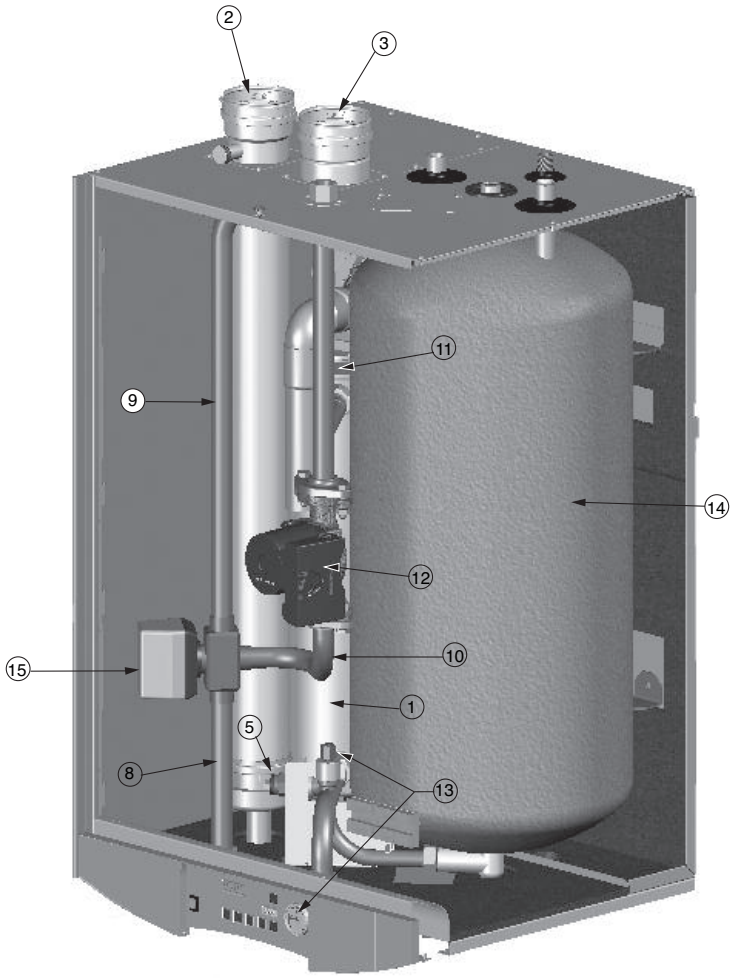


Fig. 14: Internal Components - PRESTIGE EXCELLENCE

Item	Part No.	Description
1	PSRKIT01	Heat Exchanger Body
2	PSRKIT02	Vent Outlet Adapter
3	PSRKIT03	Combustion Air Inlet Adapter
4	PSRKIT04	NTC Sensor (NTC1, NTC2 and NTC5) (Not shown)
5	PGRKIT20	LWCO Pressure Device
6	PSRKIT05	Condensate Drain Assembly (Not shown)
7	PSRKIT59	Boiler Piping - Return Assembly
8	PSRKIT60	Boiler Piping - Supply Outlet Assembly
9	PSRKIT61	Boiler Piping - Supply Long Assembly
10	PSRKIT54	Boiler Piping - Supply Short Assembly
11	PSRKIT62	Boiler Piping - Relief Valve Assembly
12	HMCIR01	Circulator
13	PSRKIT17	Pressure Gauge and Fitting
14	PSRKIT56	Excellence Water Heater Tank
15	PSRKIT57	Valve Actuator

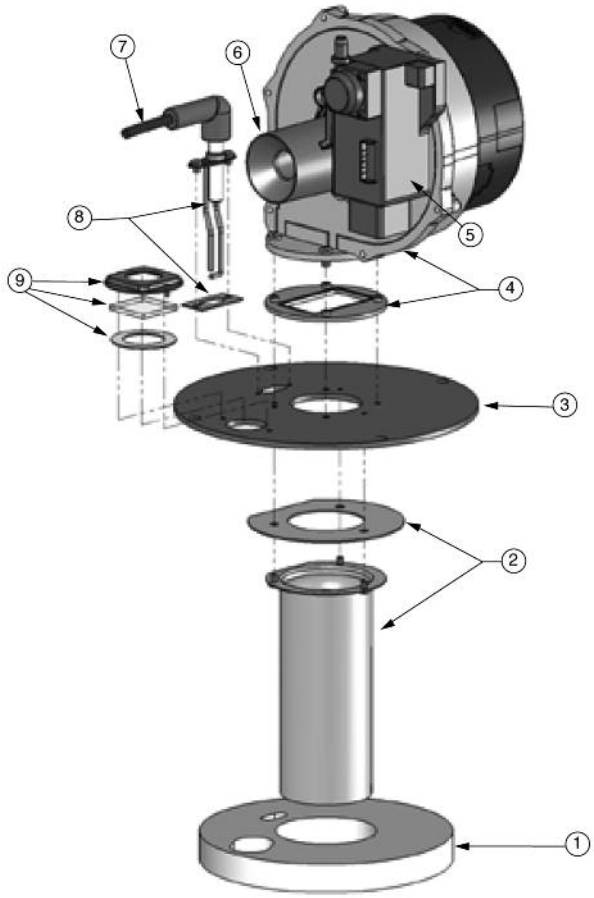


Fig. 15: Burner Components - PRESTIGE 60/110/175/250 and EXCELLENCE

Item	Part No.	Description
1	PSRKIT09	Combustion Chamber Insulation - PRESTIGE 60/100/EXCELLENCE
	PSRKIT30	Combustion Chamber Insulation - PRESTIGE 175/250
2	PSRKIT10	Burner Head with Gasket - Natural - PRESTIGE 110 and EXCELLENCE
	PSRKIT11	Burner Head with Gasket - Propane - PRESTIGE 110 EXCELLENCE, PRESTIGE 60 (all Fuels)
	PSRKIT31	Burner Head with Gasket - PRESTIGE 175/250 (All Fuels)
3	PSRKIT12	Burner Plate - PRESTIGE 60/110/EXCELLENCE
	PSRKIT32	Burner Plate - PRESTIGE 175/250
4	PSRKIT13	Blower with Gasket - PRESTIGE 175/250
	PSRKIT55	Blower with Gasket - PRESTIGE 60/110/EXCELLENCE
5	PGRKIT01	Gas Valve
6	--	Venturi -- 055 (PRESTIGE 60) -- 052 (PRESTIGE 175) -- 051 (PRESTIGE 250) -- 001 (PRESTIGE 110/EXCELLENCE)
7	PSRKIT14	Ignition Cable
8	PSRKIT15	Igniter with Gasket
9	PSRKIT16	Sight Glass Assembly (Glass, Gasket and Bracket)
10	--	Propane Orifice - Not Shown
11	--	Burner Plate Gasket - Not Shown
12	PGRKIT15	Gas Valve Rectifier Plug - Not Shown

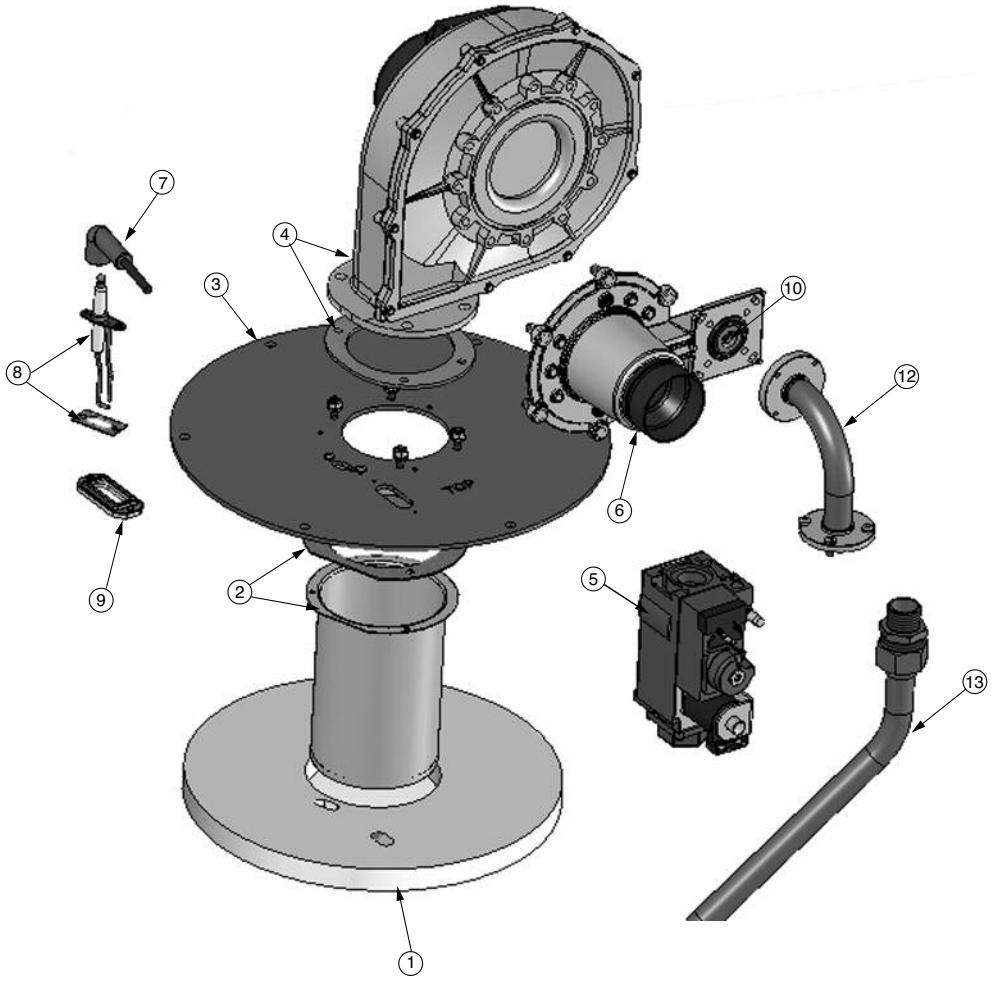


Fig. 16: Burner Components - PRESTIGE 399

Item	Part No. PRESTIGE 399	Description
1	PSRKIT37	Combustion Chamber Insulation
2	PSRKIT38	Burner Head with Gasket
3	PSRKIT39	Burner Plate
4	PSRKIT40	Blower with Gasket
5	PSRKIT41	Gas Valve
6	--	Venturi -
7	PSRKIT14	Ignition Cable
8	PSRKIT15	Igniter with Gasket
9	PSRKIT16	Sight Glass Assembly (Glass, Gasket and Bracket)
10	--	Gas Orifice
11	--	Burner Plate Gasket - Not Shown
12	PSRKIT42	Gas Valve Piping
13	PSRKIT43	Gas Supply Piping

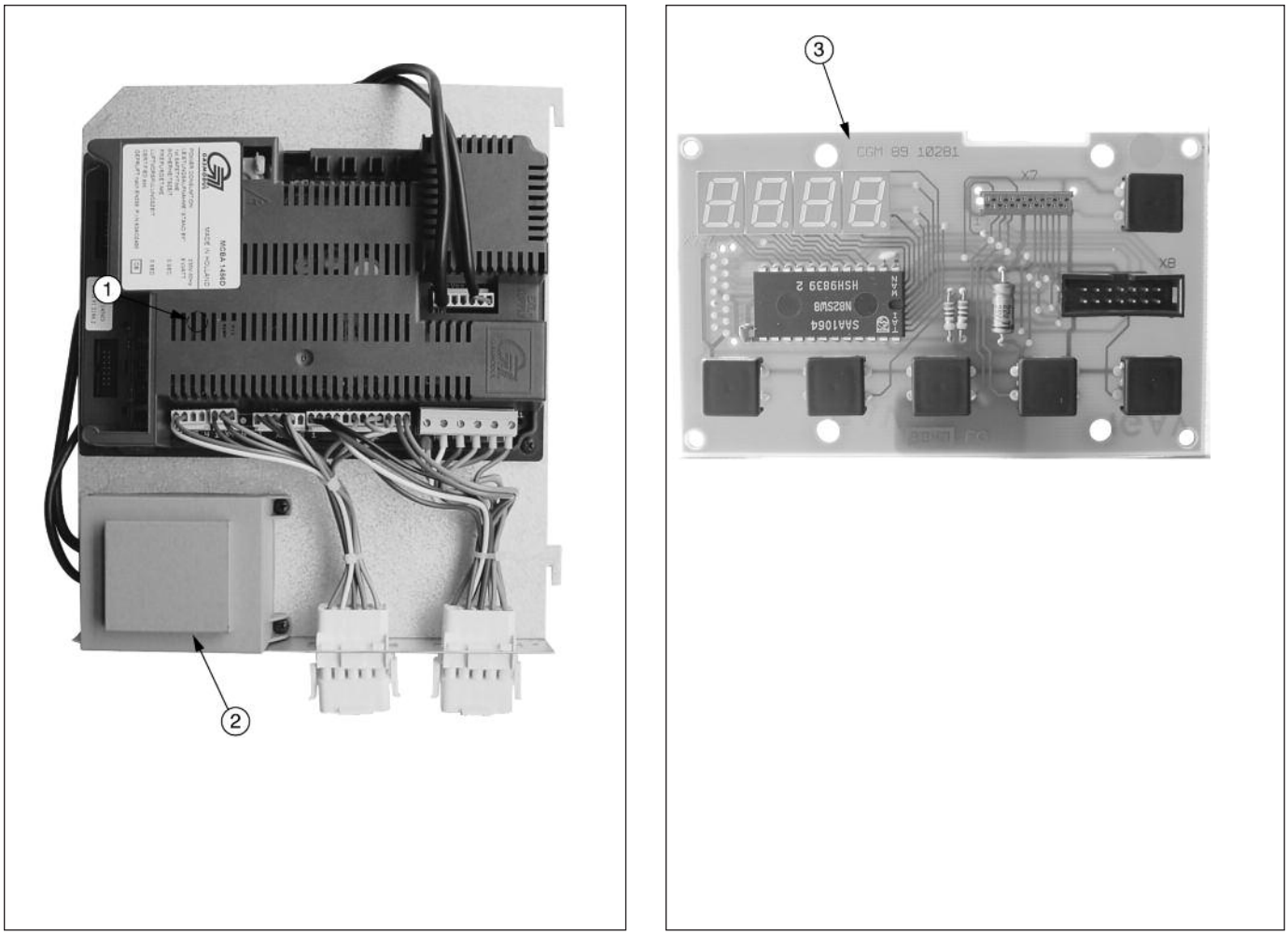


Fig. 17: Electronic Components - PRESTIGE

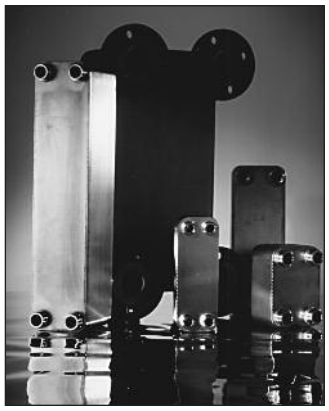
Item	Part No.	Description
1	PSRKIT50	Prestige Control Module
	PSRKIT58	EXCELLENCE Control Module
2	PSRKIT19	Transformer with Surge Protection
3	PSRKIT20	Prestige Control Module Display

The following lists the torques specifications for various screws:

Assembly Screws	Torques Specifications	
	Min. Inch-Pounds	Max. Inch-Pounds
Sight Glass	11	13
Burner Head	27	31
Igniter	27	31
Gas Valve Couplings	27	31
Blower-Outlet	27	31
Venturi to Gas Valve	31	35
Venturi to Blower	31	35
Burner Plate	44	59

Additional quality water heating equipment available from Triangle Tube

Brazed Plate Heat Exchangers



- For domestic water, snow melting, radiant floor, refrigeration
- Plates made of stainless steel, with a 99.9 % copper and brazed, ensuring a high resistance to corrosion
- Self cleaning and self descaling
- Computerized sizing available from Triangle Tube
- Available in capacities from 25,000 BTU/hr to 5,000,000 BTU/hr

SMART Indirect Fired Water Heaters

- Exclusive “tank-in-tank” design
- Stainless steel construction
- Available in 8 sizes
- Limited LIFETIME residential warranty
- 15 year limited commercial warranty
- Self cleaning/self descaling design

Maxi-flo Pool and Spa Heat Exchangers

- Constructed of high quality corrosion resistant stainless steel (AISI 316)
- Specially designed built-in flow restrictor to assure maximum heat exchange
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